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SEQUENCE LISTING

<110> Elena, Babiychuk

Sergei, Kushnir

Marc, De Block

<120> Methods and means to modulate programmed cell death in eukaryotic cells

<130> 58764.0000039

<140> US 10/705,197

<141> 2003-11-12

<150> US 09/118,276

<151> 1998-07-11

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118

Met Ala

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gcg ccg cca aag gcg tgg aag gcg gag tat gcc aag tct ggg cgg gcc
166
Ala Pro Pro Lys Ala Trp Lys Ala Glu Tyr Ala Lys Ser Gly Arg Ala

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tcg tgc aag tca tgc cgg tcc cct atc gcc aag gac cag ctc cgt ctt
214
Ser Cys Lys Ser Cys Arg Ser Pro Ile Ala Lys Asp Gln Leu Arg Leu

20   25   30

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262
Gly Lys Met Val Gln Ala Ser Gln Phe Asp Gly Phe Met Pro Met Trp

35   40   45   50

aac cat gcc agc gtt gac gat gtt gaa ggg ata gat gca ctt aga tgg
310
Asn His Ala Ser Val Asp Asp Val Glu Gly Ile Asp Ala Leu Arg Trp

                    55   60   65

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358
Asp Asp Gln Glu Lys Ile Arg Asn Tyr Val Gly Ser Ala Ser Ala Gly

            70   75   80

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406
Thr Ser Ser Thr Ala Ala Pro Pro Glu Lys Cys Thr Ile Glu Ile Ala

            85   90   95

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454
Pro Ser Ala Arg Thr Ser Cys Arg Arg Cys Ser Glu Lys Ile Thr Lys

        100   105   110

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502
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115   120   125   130

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Ile Pro Trp Tyr His Ala Asn Cys Phe Phe Glu Val Ser Pro Ser Ala

                    135   140   145

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598
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            150   155   160

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646

Arg Thr Met Leu Asp Leu Val Lys Lys Asp Val Gly Asn Asn Glu Gln

        165   170   175

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694
Asn Lys Gly Ser Lys Arg Lys Lys Ser Glu Asn Asp Ile Asp Ser Tyr

        180   185   190

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742
Lys Ser Ala Arg Leu Asp Glu Ser Thr Ser Glu Gly Thr Val Arg Asn

195   200   205   210

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790
Lys Gly Gln Leu Val Asp Pro Arg Gly Ser Asn Thr Ser Ser Ala Asp

                215   220   225

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838
Ile Gln Leu Lys Leu Lys Glu Gln Ser Asp Thr Leu Trp Lys Leu Lys

        230   235   240

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886
Asp Gly Leu Lys Thr His Val Ser Ala Ala Glu Leu Arg Asp Met Leu

        245   250   255

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934
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        260   265   270

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982
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275   280   285   290

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1030
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            295   300   305

aat gtg tca gag tgg tcc aag tgt aca tac tct gcc aca gaa cct gtc
1078
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            310   315   320

cgc gtt aag aag aag tgg caa att cca cat gga aca aag aat gat tac
1126
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            325   330   335

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1174
Leu Met Lys Trp Phe Lys Ser Gln Lys Val Lys Lys Pro Glu Arg Val

            340   345   350

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1222
Leu Pro Pro Met Ser Pro Glu Lys Ser Gly Ser Lys Ala Thr Gln Arg

355   360   365   370

aca tca ttg ctg tct tct aaa ggg ttg gat aaa tta agg ttt tct gtt
1270
Thr Ser Leu Leu Ser Ser Lys Gly Leu Asp Lys Leu Arg Phe Ser Val

            375   380   385

gta gga caa tca aaa gaa gca gca aat gag tgg att gag aag ctc aaa
1318
Val Gly Gln Ser Lys Glu Ala Ala Asn Glu Trp Ile Glu Lys Leu Lys
          390   395   400

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1366
Leu Ala Gly Ala Asn Phe Tyr Ala Arg Val Val Lys Asp Ile Asp Cys
          405   410   415

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1414
Leu Ile Ala Cys Gly Glu Leu Asp Asn Glu Asn Ala Glu Val Arg Lys
       420   425   430

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1462
Ala Arg Arg Leu Lys Ile Pro Ile Val Arg Glu Gly Tyr Ile Gly Glu
435   440   445   450

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1510
Cys Val Lys Lys Asn Lys Met Leu Pro Phe Asp Leu Tyr Lys Leu Glu
             455   460   465

aat gcc tta gag tcc tca aaa ggc agt act gtc act gtt aaa gtt aag
1558
Asn Ala Leu Glu Ser Ser Lys Gly Ser Thr Val Thr Val Lys Val Lys
          470   475   480

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1606
Gly Arg Ser Ala Val His Glu Ser Ser Gly Leu Gln Asp Thr Ala His
          485   490   495

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1654
Ile Leu Glu Asp Gly Lys Ser Ile Tyr Asn Ala Thr Leu Asn Met Ser

500   505   510

gac ctg gca cta ggt gtg aac agc tac tat gta ctc cag atc att gaa
1702
Asp Leu Ala Leu Gly Val Asn Ser Tyr Tyr Val Leu Gln Ile Ile Glu

515   520   525   530

cag gat gat ggg tct gag tgc tac gta ttt cgt aag tgg gga cgg gtt
1750
Gln Asp Asp Gly Ser Glu Cys Tyr Val Phe Arg Lys Trp Gly Arg Val

535   540   545

ggg agt gag aaa att gga ggg caa aaa ctg gag gag atg tca aaa act
1798
Gly Ser Glu Lys Ile Gly Gly Gln Lys Leu Glu Glu Met Ser Lys Thr

550   555   560

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1846
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565   570   575

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1894
Ser Trp Glu Ala Trp Glu Cys Lys Thr Asn Phe Arg Lys Gln Pro Gly

580   585   590

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1942
Arg Phe Tyr Pro Leu Asp Val Asp Tyr Gly Val Lys Lys Ala Pro Lys

595   600   605   610

cgg aaa gat atc agt gaa atg aaa agt tct ctt gct cct caa ttg cta
1990
Arg Lys Asp Ile Ser Glu Met Lys Ser Ser Leu Ala Pro Gln Leu Leu

           615   620   625

gaa ctc atg aag atg ctt ttc aat gtg gag aca tat aga gct gct atg
2038
Glu Leu Met Lys Met Leu Phe Asn Val Glu Thr Tyr Arg Ala Ala Met

           630   635   640

atg gaa ttt gaa att aat atg tca gaa atg cct ctt ggg aag cta agc
2086
Met Glu Phe Glu Ile Asn Met Ser Glu Met Pro Leu Gly Lys Leu Ser

           645   650   655

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2134
Lys Glu Asn Ile Glu Lys Gly Phe Glu Ala Leu Thr Glu Ile Gln Asn

     660   665   670

tta ttg aag gac acc gct gat caa gca ctg gct gtt aga gaa agc tta
2182
Leu Leu Lys Asp Thr Ala Asp Gln Ala Leu Ala Val Arg Glu Ser Leu

675   680   685   690

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2230
Ile Val Ala Ala Ser Asn Arg Phe Phe Thr Leu Ile Pro Ser Ile His

           695   700   705

cct cat att ata cgg gat gag gat gat ttg atg atc aaa gcg aaa atg
2278
Pro His Ile Ile Arg Asp Glu Asp Asp Leu Met Ile Lys Ala Lys Met

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2326
Leu Glu Ala Leu Gln Asp Ile Glu Ile Ala Ser Lys Ile Val Gly Phe

    725   730   735

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2374
Asp Ser Asp Ser Asp Glu Ser Leu Asp Asp Lys Tyr Met Lys Leu His

    740   745   750

tgt gac atc acc ccg ctg gct cac gat agt gaa gat tac aag tta att
2422
Cys Asp Ile Thr Pro Leu Ala His Asp Ser Glu Asp Tyr Lys Leu Ile

755   760   765   770

gag cag tat ctc ctc aac aca cat gct cct act cac aag gac tgg tcg
2470
Glu Gln Tyr Leu Leu Asn Thr His Ala Pro Thr His Lys Asp Trp Ser

                775   780   785

ctg gaa ctg gag gaa gtt ttt tca ctt gat cga gat gga gaa ctt aat
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Leu Glu Leu Glu Glu Val Phe Ser Leu Asp Arg Asp Gly Glu Leu Asn

        790   795   800

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2566
Lys Tyr Ser Arg Tyr Lys Asn Asn Leu His Asn Lys Met Leu Leu Trp

        805   810   815

cac ggt tca agg ttg acg aat ttt gtg gga att ctt agt caa ggg cta
2614
His Gly Ser Arg Leu Thr Asn Phe Val Gly Ile Leu Ser Gln Gly Leu

820   825   830

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2662
Arg Ile Ala Pro Pro Glu Ala Pro Val Thr Gly Tyr Met Phe Gly Lys

835   840   845   850

ggc ctc tac ttt gca gat cta gta agc aag agc gca caa tac tgt tat
2710
Gly Leu Tyr Phe Ala Asp Leu Val Ser Lys Ser Ala Gln Tyr Cys Tyr

                    855   860   865

gtg gat agg aat aat cct gta ggt ttg atg ctt ctt tct gag gtt gct
2758
Val Asp Arg Asn Asn Pro Val Gly Leu Met Leu Leu Ser Glu Val Ala

               870   875   880

tta gga gac atg tat gaa cta aag aaa gcc acg tcc atg gac aaa cct
2806
Leu Gly Asp Met Tyr Glu Leu Lys Lys Ala Thr Ser Met Asp Lys Pro

          885   890   895

cca aga ggg aag cat tcg acc aag gga tta ggc aaa acc gtg cca ctg
2854
Pro Arg Gly Lys His Ser Thr Lys Gly Leu Gly Lys Thr Val Pro Leu

     900   905   910

gag tca gag ttt gtg aag tgg agg gat gat gtc gta gtt ccc tgc ggc
2902
Glu Ser Glu Phe Val Lys Trp Arg Asp Asp Val Val Val Pro Cys Gly

915   920   925   930

aag ccg gtg cca tca tca att agg agc tct gaa ctc atg tac aat gag
2950

Lys Pro Val Pro Ser Ser Ile Arg Ser Ser Glu Leu Met Tyr Asn Glu

935   940   945

tac atc gtc tac aac aca tcc cag gtg aag atg cag ttc ttg ctg aag
2998
Tyr Ile Val Tyr Asn Thr Ser Gln Val Lys Met Gln Phe Leu Leu Lys

          950   955   960

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3052
Val Arg Phe His His Lys Arg

          965

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3112

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        35   40   45

Met Trp Asn His Ala Ser Val Asp Asp Val Glu Gly Ile Asp Ala Leu
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Arg Trp Asp Asp Gln Glu Lys Ile Arg Asn Tyr Val Gly Ser Ala Ser
65   70   75   80

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Ile Ala Pro Ser Ala Arg Thr Ser Cys Arg Arg Cys Ser Glu Lys Ile
            100   105   110

Thr Lys Gly Ser Val Arg Leu Ser Ala Lys Leu Glu Ser Glu Gly Pro
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Asp Lys Arg Thr Met Leu Asp Leu Val Lys Lys Asp Val Gly Asn Asn
            165   170   175

Glu Gln Asn Lys Gly Ser Lys Arg Lys Lys Ser Glu Asn Asp Ile Asp
            180   185   190

Ser Tyr Lys Ser Ala Arg Leu Asp Glu Ser Thr Ser Glu Gly Thr Val
    195   200   205

Arg Asn Lys Gly Gln Leu Val Asp Pro Arg Gly Ser Asn Thr Ser Ser
210   215   220

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225   230   235   240

Leu Lys Asp Gly Leu Lys Thr His Val Ser Ala Ala Glu Leu Arg Asp
                245   250   255

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            260   265   270

Leu Asp Arg Cys Ala Asp Gly Met Ile Phe Gly Ala Leu Gly Pro Cys
            275   280   285

Pro Val Cys Ala Asn Gly Met Tyr Tyr Tyr Asn Gly Gln Tyr Gln Cys
    290   295   300

Ser Gly Asn Val Ser Glu Trp Ser Lys Cys Thr Tyr Ser Ala Thr Glu
305   310   315   320

Pro Val Arg Val Lys Lys Lys Trp Gln Ile Pro His Gly Thr Lys Asn
                325   330   335

Asp Tyr Leu Met Lys Trp Phe Lys Ser Gln Lys Val Lys Lys Pro Glu
            340   345   350

Arg Val Leu Pro Pro Met Ser Pro Glu Lys Ser Gly Ser Lys Ala Thr
            355   360   365

Gln Arg Thr Ser Leu Leu Ser Ser Lys Gly Leu Asp Lys Leu Arg Phe
    370   375   380

Ser Val Val Gly Gln Ser Lys Glu Ala Ala Asn Glu Trp Ile Glu Lys
385   390   395   400

Leu Lys Leu Ala Gly Ala Asn Phe Tyr Ala Arg Val Val Lys Asp Ile
                405   410   415

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435   440   445

Gly Glu Cys Val Lys Lys Asn Lys Met Leu Pro Phe Asp Leu Tyr Lys
450   455   460

Leu Glu Asn Ala Leu Glu Ser Ser Lys Gly Ser Thr Val Thr Val Lys
465   470   475   480

Val Lys Gly Arg Ser Ala Val His Glu Ser Ser Gly Leu Gln Asp Thr
485   490   495

Ala His Ile Leu Glu Asp Gly Lys Ser Ile Tyr Asn Ala Thr Leu Asn
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Met Ser Asp Leu Ala Leu Gly Val Asn Ser Tyr Tyr Val Leu Gln Ile
515   520   525

Ile Glu Gln Asp Asp Gly Ser Glu Cys Tyr Val Phe Arg Lys Trp Gly
530   535   540

Arg Val Gly Ser Glu Lys Ile Gly Gly Gln Lys Leu Glu Glu Met Ser
545   550   555   560

Lys Thr Glu Ala Ile Lys Glu Phe Lys Arg Leu Phe Leu Glu Lys Thr
565   570   575

Gly Asn Ser Trp Glu Ala Trp Glu Cys Lys Thr Asn Phe Arg Lys Gln
580   585   590

Pro Gly Arg Phe Tyr Pro Leu Asp Val Asp Tyr Gly Val Lys Lys Ala
595   600   605

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Pro Lys Arg Lys Asp Ile Ser Glu Met Lys Ser Ser Leu Ala Pro Gln
   610   615   620

Leu Leu Glu Leu Met Lys Met Leu Phe Asn Val Glu Thr Tyr Arg Ala
625   630   635   640

Ala Met Met Glu Phe Glu Ile Asn Met Ser Glu Met Pro Leu Gly Lys
           645   650   655

Leu Ser Lys Glu Asn Ile Glu Lys Gly Phe Glu Ala Leu Thr Glu Ile
       660   665   670

Gln Asn Leu Leu Lys Asp Thr Ala Asp Gln Ala Leu Ala Val Arg Glu
       675   680   685

Ser Leu Ile Val Ala Ala Ser Asn Arg Phe Phe Thr Leu Ile Pro Ser
   690   695   700

Ile His Pro His Ile Ile Arg Asp Glu Asp Asp Leu Met Ile Lys Ala
705   710   715   720

Lys Met Leu Glu Ala Leu Gln Asp Ile Glu Ile Ala Ser Lys Ile Val
           725   730   735

Gly Phe Asp Ser Asp Ser Asp Glu Ser Leu Asp Asp Lys Tyr Met Lys
           740   745   750

Leu His Cys Asp Ile Thr Pro Leu Ala His Asp Ser Glu Asp Tyr Lys
       755   760   765

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   770   775   780

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785   790   795   800

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805   810   815

Leu Trp His Gly Ser Arg Leu Thr Asn Phe Val Gly Ile Leu Ser Gln
820   825   830

Gly Leu Arg Ile Ala Pro Pro Glu Ala Pro Val Thr Gly Tyr Met Phe
835   840   845

Gly Lys Gly Leu Tyr Phe Ala Asp Leu Val Ser Lys Ser Ala Gln Tyr
850   855   860

Cys Tyr Val Asp Arg Asn Asn Pro Val Gly Leu Met Leu Leu Ser Glu
865   870   875   880

Val Ala Leu Gly Asp Met Tyr Glu Leu Lys Lys Ala Thr Ser Met Asp
885   890   895

Lys Pro Pro Arg Gly Lys His Ser Thr Lys Gly Leu Gly Lys Thr Val
900   905   910

Pro Leu Glu Ser Glu Phe Val Lys Trp Arg Asp Asp Val Val Val Pro
915   920   925

Cys Gly Lys Pro Val Pro Ser Ser Ile Arg Ser Ser Glu Leu Met Tyr
930   935   940

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115
                                                     Met Ser Ala

                                                       1

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163
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      5   10   15

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211
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20   25   30   35

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259
Ile Cys Glu Ala Glu Lys Ala Val Val Ala Ala Ala Pro Thr Ser Val

              40   45   50

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307
Ala Asn Gly Tyr Asp Val Ala Val Asp Gly Lys Arg Asn Cys Gly Asn

       55   60   65

aat aag agg aaa agg tcc ggg gat ggg ggt gaa gag gga aac ggc gat
355
Asn Lys Arg Lys Arg Ser Gly Asp Gly Gly Glu Glu Gly Asn Gly Asp

       70   75   80

acg tgt aca gat gtg aca aaa cta gag ggc atg agc tat cgt gag ctg
403
Thr Cys Thr Asp Val Thr Lys Leu Glu Gly Met Ser Tyr Arg Glu Leu

       85   90   95

cag gga ttg gcc aag gca cgt gga gtt gcg gca aat ggg ggc aag aaa
451
Gln Gly Leu Ala Lys Ala Arg Gly Val Ala Ala Asn Gly Gly Lys Lys

100   105   110   115

gat gtt atc cag agg ttg ctc tcg gcg act gct ggt cct gct gca gtt
499
Asp Val Ile Gln Arg Leu Leu Ser Ala Thr Ala Gly Pro Ala Ala Val

          120   125   130

gca gat ggt ggt cct ctg ggc gcc aag gaa gtc ata aaa ggt ggt gat
547
Ala Asp Gly Gly Pro Leu Gly Ala Lys Glu Val Ile Lys Gly Gly Asp

       135   140   145

gag gag gtt gag gtg aaa aag gag aag atg gtt act gcc acg aag aag
595
Glu Glu Val Glu Val Lys Lys Glu Lys Met Val Thr Ala Thr Lys Lys

      150   155   160

gga gct gca gtg ctg gat cag cac att ccc gat cac ata aaa gtg aac
643
Gly Ala Ala Val Leu Asp Gln His Ile Pro Asp His Ile Lys Val Asn

       165   170   175

tat cat gtc ttg caa gtg ggc gat gaa atc tat gat gcc acc ttg aac
691
Tyr His Val Leu Gln Val Gly Asp Glu Ile Tyr Asp Ala Thr Leu Asn

180   185   190   195

cag act aat gtt gga gac aac aac aat aag ttc tat atc att caa gtt
739
Gln Thr Asn Val Gly Asp Asn Asn Asn Lys Phe Tyr Ile Ile Gln Val

       200   205   210

tta gaa tct gat gct ggt gga agc ttt atg gtt tac aat aga tgg gga
787
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         215   220   225

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835
Arg Val Gly Val Arg Gly Gln Asp Lys Leu His Gly Pro Ser Pro Thr

       230   235   240

cga gac caa gca ata tat gaa ttt gag ggg aag ttc cac aac aaa acc
883
Arg Asp Gln Ala Ile Tyr Glu Phe Glu Gly Lys Phe His Asn Lys Thr

       245   250   255

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931
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260   265   270   275

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979
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          280   285   290

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1027
Lys Gly Ser Ile Thr Asp Gln Ile Lys Glu Thr Lys Leu Glu Thr Arg

          295   300   305

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1075
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          310   315   320

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1123
Arg Met Val Glu Ile Gly Tyr Asn Ala Glu Lys Leu Pro Leu Gly Lys

          325   330   335

cta agg aaa gct aca ata ctt aag ggt tat cat gtt ttg aaa agg ata
1171
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340   345   350   355

tcc gat gtt att tca aag gcg gac agg aga cat ctt gag caa ttg act
1219
Ser Asp Val Ile Ser Lys Ala Asp Arg Arg His Leu Glu Gln Leu Thr

          360   365   370

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1267
Gly Glu Phe Tyr Thr Val Ile Pro His Asp Phe Gly Phe Arg Lys Met

375   380   385

cgt gaa ttt att atc gat act cct cag aaa cta aaa gct aag ctg gag
1315
Arg Glu Phe Ile Ile Asp Thr Pro Gln Lys Leu Lys Ala Lys Leu Glu

    390   395   400

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1363
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405   410   415

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1411
Asp Asp Ser Ser Asp Gln Asp Asp Pro Leu Tyr Ala Arg Tyr Lys Gln

420   425   430   435

ctt cat tgt gat ttc aca cct ctt gaa gct gat tca gat gag tac tct
1459
Leu His Cys Asp Phe Thr Pro Leu Glu Ala Asp Ser Asp Glu Tyr Ser

              440   445   450

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1507
Met Ile Lys Ser Tyr Leu Arg Asn Thr His Gly Lys Thr His Ser Gly

         455   460   465

tat acg gtg gac ata gtg caa ata ttt aag gtt tca agg cat ggt gaa
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Tyr Thr Val Asp Ile Val Gln Ile Phe Lys Val Ser Arg His Gly Glu

         470   475   480

aca gag cga ttt caa aaa ttt gct agt aca aga aat agg atg ctt ttg
1603

Thr Glu Arg Phe Gln Lys Phe Ala Ser Thr Arg Asn Arg Met Leu Leu

    485   490   495

tgg cat ggt tct cgg ttg agc aac tgg gct ggg atc ctt tct cag ggt
1651
Trp His Gly Ser Arg Leu Ser Asn Trp Ala Gly Ile Leu Ser Gln Gly

500   505   510   515

ctg cga atc gct cct cct gaa gca cct gtt act ggt tac atg ttt ggc
1699
Leu Arg Ile Ala Pro Pro Glu Ala Pro Val Thr Gly Tyr Met Phe Gly

        520   525   530

aag ggt gtt tac ttt gct gac atg ttt tca aag agt gca aac tat tgc
1747
Lys Gly Val Tyr Phe Ala Asp Met Phe Ser Lys Ser Ala Asn Tyr Cys

        535   540   545

tac gcc tct gaa gca tgt aga tct gga gta ctg ctt tta tgt gag gtt
1795
Tyr Ala Ser Glu Ala Cys Arg Ser Gly Val Leu Leu Leu Cys Glu Val

      550   555   560

gca ttg ggc gat atg aat gag cta ctg aat gca gat tac gat gct aat
1843
Ala Leu Gly Asp Met Asn Glu Leu Leu Asn Ala Asp Tyr Asp Ala Asn

      565   570   575

aac ctg ccc aaa gga aaa tta aga tcc aag gga gtt ggt caa aca gca
1891
Asn Leu Pro Lys Gly Lys Leu Arg Ser Lys Gly Val Gly Gln Thr Ala

580   585   590   595

cct aac atg gtc gag tct aag gtc gct gac gat ggt gtt gtt gtt ccc

1939
Pro Asn Met Val Glu Ser Lys Val Ala Asp Asp Gly Val Val Val Pro

                600   605   610

ctt ggc gaa ccc aaa cag gaa cct tcc aaa agg ggt ggc ttg ctt tat
1987
Leu Gly Glu Pro Lys Gln Glu Pro Ser Lys Arg Gly Gly Leu Leu Tyr

           615   620   625

aat gag tac ata gtg tac aac gta gac cag ata aga atg cgg tat gtc
2035
Asn Glu Tyr Ile Val Tyr Asn Val Asp Gln Ile Arg Met Arg Tyr Val

           630   635   640

tta cat gtt aac ttc aat ttc aag aga cgg tag atgttgcaaa gagctgaaac
2088
Leu His Val Asn Phe Asn Phe Lys Arg Arg

      645   650

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            20   25   30

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        35   40   45

Thr Ser Val Ala Asn Gly Tyr Asp Val Ala Val Asp Gly Lys Arg Asn
    50   55   60

Cys Gly Asn Asn Lys Arg Lys Arg Ser Gly Asp Gly Gly Glu Glu Gly
65   70   75   80

Asn Gly Asp Thr Cys Thr Asp Val Thr Lys Leu Glu Gly Met Ser Tyr
            85   90   95

Arg Glu Leu Gln Gly Leu Ala Lys Ala Arg Gly Val Ala Ala Asn Gly
            100   105   110

Gly Lys Lys Asp Val Ile Gln Arg Leu Leu Ser Ala Thr Ala Gly Pro
        115   120   125

Ala Ala Val Ala Asp Gly Gly Pro Leu Gly Ala Lys Glu Val Ile Lys
    130   135   140

Gly Gly Asp Glu Glu Val Glu Val Lys Lys Glu Lys Met Val Thr Ala
145   150   155   160

Thr Lys Lys Gly Ala Ala Val Leu Asp Gln His Ile Pro Asp His Ile
            165   170   175

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Lys Val Asn Tyr His Val Leu Gln Val Gly Asp Glu Ile Tyr Asp Ala
          180   185   190

Thr Leu Asn Gln Thr Asn Val Gly Asp Asn Asn Asn Lys Phe Tyr Ile
          195   200   205

Ile Gln Val Leu Glu Ser Asp Ala Gly Gly Ser Phe Met Val Tyr Asn
          210   215   220

Arg Trp Gly Arg Val Gly Val Arg Gly Gln Asp Lys Leu His Gly Pro
225   230   235   240

Ser Pro Thr Arg Asp Gln Ala Ile Tyr Glu Phe Glu Gly Lys Phe His
          245   250   255

Asn Lys Thr Asn Asn His Trp Ser Asp Arg Lys Asn Phe Lys Cys Tyr
          260   265   270

Ala Lys Lys Tyr Thr Trp Leu Glu Met Asp Tyr Gly Glu Thr Glu Lys
          275   280   285

Glu Ile Glu Lys Gly Ser Ile Thr Asp Gln Ile Lys Glu Thr Lys Leu
          290   295   300

Glu Thr Arg Ile Ala Gln Phe Ile Ser Leu Ile Cys Asn Ile Ser Met
305   310   315   320

Met Lys Gln Arg Met Val Glu Ile Gly Tyr Asn Ala Glu Lys Leu Pro
          325   330   335

Leu Gly Lys Leu Arg Lys Ala Thr Ile Leu Lys Gly Tyr His Val Leu
          340   345   350

Lys Arg Ile Ser Asp Val Ile Ser Lys Ala Asp Arg Arg His Leu Glu
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Gln Leu Thr Gly Glu Phe Tyr Thr Val Ile Pro His Asp Phe Gly Phe
    370   375   380

Arg Lys Met Arg Glu Phe Ile Ile Asp Thr Pro Gln Lys Leu Lys Ala
385   390   395   400

Lys Leu Glu Met Val Glu Ala Leu Gly Glu Ile Glu Ile Ala Thr Lys
          405   410   415

Leu Leu Glu Asp Asp Ser Ser Asp Gln Asp Asp Pro Leu Tyr Ala Arg
        420   425   430

Tyr Lys Gln Leu His Cys Asp Phe Thr Pro Leu Glu Ala Asp Ser Asp
      435   440   445

Glu Tyr Ser Met Ile Lys Ser Tyr Leu Arg Asn Thr His Gly Lys Thr
    450   455   460

His Ser Gly Tyr Thr Val Asp Ile Val Gln Ile Phe Lys Val Ser Arg
465   470   475   480

His Gly Glu Thr Glu Arg Phe Gln Lys Phe Ala Ser Thr Arg Asn Arg
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Met Leu Leu Trp His Gly Ser Arg Leu Ser Asn Trp Ala Gly Ile Leu
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Ser Gln Gly Leu Arg Ile Ala Pro Pro Glu Ala Pro Val Thr Gly Tyr
      515   520   525

Met Phe Gly Lys Gly Val Tyr Phe Ala Asp Met Phe Ser Lys Ser Ala
    530   535   540

Asn Tyr Cys Tyr Ala Ser Glu Ala Cys Arg Ser Gly Val Leu Leu Leu
545   550   555   560

Cys Glu Val Ala Leu Gly Asp Met Asn Glu Leu Leu Asn Ala Asp Tyr
                565   570   575

Asp Ala Asn Asn Leu Pro Lys Gly Lys Leu Arg Ser Lys Gly Val Gly
                580   585   590

Gln Thr Ala Pro Asn Met Val Glu Ser Lys Val Ala Asp Asp Gly Val
                595   600   605

Val Val Pro Leu Gly Glu Pro Lys Gln Glu Pro Ser Lys Arg Gly Gly
    610   615   620

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120

agacgaaa atg gcg aac aag ctc aaa gtc gac gaa ctc cgt tta aaa ctc
170
          Met Ala Asn Lys Leu Lys Val Asp Glu Leu Arg Leu Lys Leu

          1   5   10

gcc gag cgt gga ctc agt act act gga gtc aaa gcc gtt ctg gtg gag
218
Ala Glu Arg Gly Leu Ser Thr Thr Gly Val Lys Ala Val Leu Val Glu

15   20   25   30

agg ctt gaa gag gct atc gca gaa gac act aag aag gaa gaa tca aag
266
Arg Leu Glu Glu Ala Ile Ala Glu Asp Thr Lys Lys Glu Glu Ser Lys

          35   40   45

agc aag agg aaa aga aat tct tct aat gat act tat gaa tcg aac aaa
314
Ser Lys Arg Lys Arg Asn Ser Ser Asn Asp Thr Tyr Glu Ser Asn Lys

            50   55   60

ttg att gca att ggc gaa ttt cgt ggg atg att gtg aag gaa ttg cgt
362
Leu Ile Ala Ile Gly Glu Phe Arg Gly Met Ile Val Lys Glu Leu Arg

          65   70   75

gag gaa gct att aag aga ggc tta gat aca aca gga acc aaa aag gat
410
Glu Glu Ala Ile Lys Arg Gly Leu Asp Thr Thr Gly Thr Lys Lys Asp

          80   85   90

ctt ctt gag agg ctt tgc aat gat gct aat aac gtt tcc aat gca cca
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Leu Leu Glu Arg Leu Cys Asn Asp Ala Asn Asn Val Ser Asn Ala Pro

95   100   105   110

gtc aaa tcc agt aat ggg aca gat gaa gct gaa gat gac aac aat ggc
506
Val Lys Ser Ser Asn Gly Thr Asp Glu Ala Glu Asp Asp Asn Asn Gly

              115   120   125

ttt gaa gaa gaa aag aaa gaa gag aaa atc gta acc gcg aca aag aag
554
Phe Glu Glu Glu Lys Lys Glu Glu Lys Ile Val Thr Ala Thr Lys Lys

              130   135   140

ggt gca gcg gtg cta gat cag tgg att cct gat gag ata aag agt cag
602
Gly Ala Ala Val Leu Asp Gln Trp Ile Pro Asp Glu Ile Lys Ser Gln

              145   150   155

tac cat gtt cta caa agg ggt gat gat gtt tat gat gct atc tta aat
650
Tyr His Val Leu Gln Arg Gly Asp Asp Val Tyr Asp Ala Ile Leu Asn

              160   165   170

cag aca aat gtc agg gat aat aat aac aag ttc ttt gtc cta caa gtc
698
Gln Thr Asn Val Arg Asp Asn Asn Asn Lys Phe Phe Val Leu Gln Val

175   180   185   190

cta gag tcg gat agt aaa aag aca tac atg gtt tac act aga tgg gga
746
Leu Glu Ser Asp Ser Lys Lys Thr Tyr Met Val Tyr Thr Arg Trp Gly

              195   200   205

aga gtt ggt gtg aaa gga caa agt aag cta gat ggg cct tat gac tca
794

Arg Val Gly Val Lys Gly Gln Ser Lys Leu Asp Gly Pro Tyr Asp Ser

       210   215   220

tgg gat cgt gcg ata gag ata ttt acc aat aag ttc aat gac aag aca
842
Trp Asp Arg Ala Ile Glu Ile Phe Thr Asn Lys Phe Asn Asp Lys Thr

       225   230   235

aag aat tat tgg tct gac aga aag gag ttt atc cca cat ccc aag tcc
890
Lys Asn Tyr Trp Ser Asp Arg Lys Glu Phe Ile Pro His Pro Lys Ser

    240   245   250

tat aca tgg ctc gaa atg gat tac gga aaa gag gaa aat gat tca ccg
938
Tyr Thr Trp Leu Glu Met Asp Tyr Gly Lys Glu Glu Asn Asp Ser Pro

255   260   265   270

gtc aat aat gat att ccg agt tca tct tcc gaa gtt aaa cct gaa caa
986
Val Asn Asn Asp Ile Pro Ser Ser Ser Glu Val Lys Pro Glu Gln

       275   280   285

tca aaa cta gat act cgg gtt gcc aag ttc atc tct ctt ata tgt aat
1034
Ser Lys Leu Asp Thr Arg Val Ala Lys Phe Ile Ser Leu Ile Cys Asn

       290   295   300

gtc agc atg atg gca cag cat atg atg gaa ata gga tat aac gct aac
1082
Val Ser Met Met Ala Gln His Met Met Glu Ile Gly Tyr Asn Ala Asn

       305   310   315

aaa ttg cca ctc ggc aag ata agc aag tcc aca att tca aag ggt tat

1130
Lys Leu Pro Leu Gly Lys Ile Ser Lys Ser Thr Ile Ser Lys Gly Tyr

    320   325   330

gaa gtg ctg aag aga ata tcg gag gtg att gac cgg tat gat aga acg
1178
Glu Val Leu Lys Arg Ile Ser Glu Val Ile Asp Arg Tyr Asp Arg Thr

335   340   345   350

agg ctt gag gaa ctg agt gga gag ttc tac aca gtg ata cct cat gat
1226
Arg Leu Glu Glu Leu Ser Gly Glu Phe Tyr Thr Val Ile Pro His Asp

      355   360   365

ttt ggt ttt aag aaa atg agt cag ttt gtt ata gac act cct caa aag
1274
Phe Gly Phe Lys Lys Met Ser Gln Phe Val Ile Asp Thr Pro Gln Lys

      370   375   380

ttg aaa cag aaa att gaa atg gtt gaa gca tta ggt gaa att gaa ctc
1322
Leu Lys Gln Lys Ile Glu Met Val Glu Ala Leu Gly Glu Ile Glu Leu

      385   390   395

gca aca aag ttg ttg tcc gtc gac ccg gga ttg cag gat gat cct tta
1370
Ala Thr Lys Leu Leu Ser Val Asp Pro Gly Leu Gln Asp Asp Pro Leu

    400   405   410

tat tat cac tac cag caa ctt aat tgt ggt ttg acg cca gta gga aat
1418
Tyr Tyr His Tyr Gln Gln Leu Asn Cys Gly Leu Thr Pro Val Gly Asn

    415   420   425   430

gat tca gag gag ttc tct atg gtt gct aat tac atg gag aac act cat
1466
Asp Ser Glu Glu Phe Ser Met Val Ala Asn Tyr Met Glu Asn Thr His
            435   440   445

gca aag acg cat tcg gga tat acg gtt gag att gcc caa cta ttt aga
1514
Ala Lys Thr His Ser Gly Tyr Thr Val Glu Ile Ala Gln Leu Phe Arg
            450   455   460

gct tcg aga gct gtt gaa gct gat cga ttc caa cag ttt tca agt tcg
1562
Ala Ser Arg Ala Val Glu Ala Asp Arg Phe Gln Gln Phe Ser Ser Ser
            465   470   475

aag aac agg atg cta ctc tgg cac ggt tca cgt ctc act aac tgg gct
1610
Lys Asn Arg Met Leu Leu Trp His Gly Ser Arg Leu Thr Asn Trp Ala
      480   485   490

ggt att tta tct caa ggt ctg cga ata gct cct cct gaa gcg cct gta
1658
Gly Ile Leu Ser Gln Gly Leu Arg Ile Ala Pro Pro Glu Ala Pro Val
495   500   505   510

act ggt tac atg ttt gga aaa ggg gtt tac ttt gcg gat atg ttc tcc
1706
Thr Gly Tyr Met Phe Gly Lys Gly Val Tyr Phe Ala Asp Met Phe Ser
            515   520   525

aag agt gcg aac tat tgc tat gcc aac act ggc gct aat gat ggc gtt
1754
Lys Ser Ala Asn Tyr Cys Tyr Ala Asn Thr Gly Ala Asn Asp Gly Val
            530   535   540

ctg ctc ctc tgc gag gtt gct ttg gga gac atg aat gaa ctt ctg tat
1802
Leu Leu Leu Cys Glu Val Ala Leu Gly Asp Met Asn Glu Leu Leu Tyr

     545   550   555

tca gat tat aac gcg gat aat cta ccc ccg gga aag cta agc aca aaa
1850
Ser Asp Tyr Asn Ala Asp Asn Leu Pro Pro Gly Lys Leu Ser Thr Lys

     560   565   570

ggt gtg ggg aaa aca gca cca aac cca tca gag gct caa aca cta gaa
1898
Gly Val Gly Lys Thr Ala Pro Asn Pro Ser Glu Ala Gln Thr Leu Glu

575   580   585   590

gac ggt gtt gtt gtt cca ctt ggc aaa cca gtg gaa cgt tca tgc tcc
1946
Asp Gly Val Val Val Pro Leu Gly Lys Pro Val Glu Arg Ser Cys Ser

       595   600   605

aag ggg atg ttg ttg tac aac gaa tat ata gtc tac aat gtg gaa caa
1994
Lys Gly Met Leu Leu Tyr Asn Glu Tyr Ile Val Tyr Asn Val Glu Gln

     610   615   620

atc aag atg cgt tat gtg atc caa gtc aaa ttc aac tac aag cac taa
2042
Ile Lys Met Arg Tyr Val Ile Gln Val Lys Phe Asn Tyr Lys His

     625   630   635

aacttatgta tattagcttt tgaacatcaa ctaattatcc aaaaatcagc gttttattgt
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Glu Glu Ala Ile Ala Glu Asp Thr Lys Lys Glu Glu Ser Lys Ser Lys
        35   40   45

Arg Lys Arg Asn Ser Ser Asn Asp Thr Tyr Glu Ser Asn Lys Leu Ile
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Ala Ile Gly Glu Phe Arg Gly Met Ile Val Lys Glu Leu Arg Glu Glu
65   70   75   80

Ala Ile Lys Arg Gly Leu Asp Thr Thr Gly Thr Lys Lys Asp Leu Leu
                85   90   95

Glu Arg Leu Cys Asn Asp Ala Asn Asn Val Ser Asn Ala Pro Val Lys
                100   105   110

Ser Ser Asn Gly Thr Asp Glu Ala Glu Asp Asp Asn Asn Gly Phe Glu
            115   120   125

Glu Glu Lys Lys Glu Glu Lys Ile Val Thr Ala Thr Lys Lys Gly Ala
        130   135   140

Ala Val Leu Asp Gln Trp Ile Pro Asp Glu Ile Lys Ser Gln Tyr His
145   150   155   160

Val Leu Gln Arg Gly Asp Asp Val Tyr Asp Ala Ile Leu Asn Gln Thr
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Asn Val Arg Asp Asn Asn Asn Lys Phe Phe Val Leu Gln Val Leu Glu
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Ser Asp Ser Lys Lys Thr Tyr Met Val Tyr Thr Arg Trp Gly Arg Val
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Gly Val Lys Gly Gln Ser Lys Leu Asp Gly Pro Tyr Asp Ser Trp Asp
    210   215   220

Arg Ala Ile Glu Ile Phe Thr Asn Lys Phe Asn Asp Lys Thr Lys Asn
225   230   235   240

Tyr Trp Ser Asp Arg Lys Glu Phe Ile Pro His Pro Lys Ser Tyr Thr
                245   250   255

Trp Leu Glu Met Asp Tyr Gly Lys Glu Glu Asn Asp Ser Pro Val Asn
                260   265   270

Asn Asp Ile Pro Ser Ser Ser Ser Glu Val Lys Pro Glu Gln Ser Lys
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Leu Asp Thr Arg Val Ala Lys Phe Ile Ser Leu Ile Cys Asn Val Ser
    290   295   300

Met Met Ala Gln His Met Met Glu Ile Gly Tyr Asn Ala Asn Lys Leu
305   310   315   320

Pro Leu Gly Lys Ile Ser Lys Ser Thr Ile Ser Lys Gly Tyr Glu Val
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Leu Lys Arg Ile Ser Glu Val Ile Asp Arg Tyr Asp Arg Thr Arg Leu
            340   345   350

Glu Glu Leu Ser Gly Glu Phe Tyr Thr Val Ile Pro His Asp Phe Gly
            355   360   365

Phe Lys Lys Met Ser Gln Phe Val Ile Asp Thr Pro Gln Lys Leu Lys
    370   375   380

Gln Lys Ile Glu Met Val Glu Ala Leu Gly Glu Ile Glu Leu Ala Thr
385   390   395   400

Lys Leu Leu Ser Val Asp Pro Gly Leu Gln Asp Asp Pro Leu Tyr Tyr
                405   410   415

His Tyr Gln Gln Leu Asn Cys Gly Leu Thr Pro Val Gly Asn Asp Ser
            420   425   430

Glu Glu Phe Ser Met Val Ala Asn Tyr Met Glu Asn Thr His Ala Lys
            435   440   445

Thr His Ser Gly Tyr Thr Val Glu Ile Ala Gln Leu Phe Arg Ala Ser
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Arg Ala Val Glu Ala Asp Arg Phe Gln Gln Phe Ser Ser Ser Lys Asn
465   470   475   480

Arg Met Leu Leu Trp His Gly Ser Arg Leu Thr Asn Trp Ala Gly Ile
                485   490   495

Leu Ser Gln Gly Leu Arg Ile Ala Pro Pro Glu Ala Pro Val Thr Gly
            500   505   510

Tyr Met Phe Gly Lys Gly Val Tyr Phe Ala Asp Met Phe Ser Lys Ser
            515   520   525

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Ala Asn Tyr Cys Tyr Ala Asn Thr Gly Ala Asn Asp Gly Val Leu Leu
    530             535             540

Leu Cys Glu Val Ala Leu Gly Asp Met Asn Glu Leu Leu Tyr Ser Asp
545             550             555             560

Tyr Asn Ala Asp Asn Leu Pro Pro Gly Lys Leu Ser Thr Lys Gly Val
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Gly Lys Thr Ala Pro Asn Pro Ser Glu Ala Gln Thr Leu Glu Asp Gly
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Val Val Val Pro Leu Gly Lys Pro Val Glu Arg Ser Cys Ser Lys Gly
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113
                       Met Ala Ala Pro Pro Lys Ala Trp Lys Ala Glu

                       1   5   10

tat gcc aag tct ggg cgg gcc tcg tgc aag tca tgc cgg tcc cct atc
161
Tyr Ala Lys Ser Gly Arg Ala Ser Cys Lys Ser Cys Arg Ser Pro Ile

15   20   25

gcc aag gac cag ctc cgt ctt ggc aag atg gtt cag gcg tca cag ttc
209
Ala Lys Asp Gln Leu Arg Leu Gly Lys Met Val Gln Ala Ser Gln Phe

        30   35   40

gac ggc ttc atg ccg atg tgg aac cat gcc agg tgc atc ttc agc aag
257
Asp Gly Phe Met Pro Met Trp Asn His Ala Arg Cys Ile Phe Ser Lys

        45   50   55

aag aac cag ata aaa tcc gtt gac gat gtt gaa ggg ata gat gca ctt
305
Lys Asn Gln Ile Lys Ser Val Asp Asp Val Glu Gly Ile Asp Ala Leu

60   65   70   75

aga tgg gat gat caa gag aag ata cga aac tac gtt ggg agt gcc tca
353
Arg Trp Asp Asp Gln Glu Lys Ile Arg Asn Tyr Val Gly Ser Ala Ser

                80   85   90

gct ggt aca agt tct aca gct gct cct cct gag aaa tgt aca att gag
401
Ala Gly Thr Ser Ser Thr Ala Ala Pro Pro Glu Lys Cys Thr Ile Glu

                95   100   105

att gct cca tct gcc cgt act tca tgt aga cga tgc agt gaa aag att
449
Ile Ala Pro Ser Ala Arg Thr Ser Cys Arg Arg Cys Ser Glu Lys Ile

                110   115   120

aca aaa gga tcg gtc cgt ctt tca gct aag ctt gag agt gaa ggt ccc
497

Thr Lys Gly Ser Val Arg Leu Ser Ala Lys Leu Glu Ser Glu Gly Pro

    125   130   135

aag ggt ata cca tgg tat cat gcc aac tgt ttc ttt gag gta tcc ccg
545
Lys Gly Ile Pro Trp Tyr His Ala Asn Cys Phe Phe Glu Val Ser Pro

    140   145   150   155

tct gca act gtt gag aag ttc tca ggc tgg gat act ttg tcc gat gag
593
Ser Ala Thr Val Glu Lys Phe Ser Gly Trp Asp Thr Leu Ser Asp Glu

          160   165   170

gat aag aga acc atg ctc gat ctt gtt aaa aaa gat gtt ggc aac aat
641
Asp Lys Arg Thr Met Leu Asp Leu Val Lys Lys Asp Val Gly Asn Asn

        175   180   185

gaa caa aat aag ggt tcc aag cgc aag aaa agt gaa aat gat att gat
689
Glu Gln Asn Lys Gly Ser Lys Arg Lys Lys Ser Glu Asn Asp Ile Asp

      190   195   200

agc tac aaa tcc gcc agg tta gat gaa agt aca tct gaa ggt aca gtg
737
Ser Tyr Lys Ser Ala Arg Leu Asp Glu Ser Thr Ser Glu Gly Thr Val

    205   210   215

cga aac aaa ggg caa ctt gta gac cca cgt ggt tcc aat act agt tca
785
Arg Asn Lys Gly Gln Leu Val Asp Pro Arg Gly Ser Asn Thr Ser Ser

    220   225   230   235

gct gat atc caa cta aag ctt aag gag caa agt gac aca ctt tgg aag

833
Ala Asp Ile Gln Leu Lys Leu Lys Glu Gln Ser Asp Thr Leu Trp Lys

　　　　　　　240　　　　　　　　　　245　　　　　　　　　　250

tta aag gat gga ctt aag act cat gta tcg gct gct gaa tta agg gat
881
Leu Lys Asp Gly Leu Lys Thr His Val Ser Ala Ala Glu Leu Arg Asp

　　　　　　　255　　　　　　　　　　260　　　　　　　　　　265

atg ctt gag gct aat ggg cag gat aca tca gga cca gaa agg cac cta
929
Met Leu Glu Ala Asn Gly Gln Asp Thr Ser Gly Pro Glu Arg His Leu

　　　　　　　270　　　　　　　　　　275　　　　　　　　　　280

ttg gat cgc tgt gcg gat gga atg ata ttt gga gcg ctg ggt cct tgc
977
Leu Asp Arg Cys Ala Asp Gly Met Ile Phe Gly Ala Leu Gly Pro Cys

　　　　　　　285　　　　　　　　　　290　　　　　　　　　　295

cca gtc tgt gct aat ggc atg tac tat tat aat ggt cag tac caa tgc
1025
Pro Val Cys Ala Asn Gly Met Tyr Tyr Tyr Asn Gly Gln Tyr Gln Cys

300　　　　　　　　　　305　　　　　　　　　　310　　　　　　　　　　315

agt ggt aat gtg tca gag tgg tcc aag tgt aca tac tct gcc aca gaa
1073
Ser Gly Asn Val Ser Glu Trp Ser Lys Cys Thr Tyr Ser Ala Thr Glu

　　　　　　　320　　　　　　　　　　325　　　　　　　　　　330

cct gtc cgc gtt aag aag aag tgg caa att cca cat gga aca aag aat
1121
Pro Val Arg Val Lys Lys Lys Trp Gln Ile Pro His Gly Thr Lys Asn

　　　　　　　335　　　　　　　　　　340　　　　　　　　　　345

Page 51

gat tac ctt atg aag tgg ttc aaa tct caa aag gtt aag aaa cca gag
1169
Asp Tyr Leu Met Lys Trp Phe Lys Ser Gln Lys Val Lys Lys Pro Glu

      350   355   360

agg gtt ctt cca cca atg tca cct gag aaa tct gga agt aaa gca act
1217
Arg Val Leu Pro Pro Met Ser Pro Glu Lys Ser Gly Ser Lys Ala Thr

      365   370   375

cag aga aca tca ttg ctg tct tct aaa ggg ttg gat aaa tta agg ttt
1265
Gln Arg Thr Ser Leu Leu Ser Ser Lys Gly Leu Asp Lys Leu Arg Phe

380   385   390   395

tct gtt gta gga caa tca aaa gaa gca gca aat gag tgg att gag aag
1313
Ser Val Val Gly Gln Ser Lys Glu Ala Ala Asn Glu Trp Ile Glu Lys

      400   405   410

ctc aaa ctt gct ggt gcc aac ttc tat gcc agg gtt gtc aaa gat att
1361
Leu Lys Leu Ala Gly Ala Asn Phe Tyr Ala Arg Val Val Lys Asp Ile

      415   420   425

gat tgt tta att gca tgt ggt gag ctc gac aat gaa aat gct gaa gtc
1409
Asp Cys Leu Ile Ala Cys Gly Glu Leu Asp Asn Glu Asn Ala Glu Val

      430   435   440

agg aaa gca agg agg ctg aag ata cca att gta agg gag ggt tac att
1457
Arg Lys Ala Arg Arg Leu Lys Ile Pro Ile Val Arg Glu Gly Tyr Ile

      445   450   455

gga gaa tgt gtt aaa aag aac aaa atg ctg cca ttt gat ttg tat aaa
1505
Gly Glu Cys Val Lys Lys Asn Lys Met Leu Pro Phe Asp Leu Tyr Lys

460   465   470   475

cta gag aat gcc tta gag tcc tca aaa ggc agt act gtc act gtt aaa
1553
Leu Glu Asn Ala Leu Glu Ser Ser Lys Gly Ser Thr Val Thr Val Lys

                480   485   490

gtt aag ggc cga agt gct gtt cat gag tcc tct ggt ttg caa gat act
1601
Val Lys Gly Arg Ser Ala Val His Glu Ser Ser Gly Leu Gln Asp Thr

        495   500   505

gct cac att ctt gaa gat ggg aaa agc ata tac aat gca acc tta aac
1649
Ala His Ile Leu Glu Asp Gly Lys Ser Ile Tyr Asn Ala Thr Leu Asn

        510   515   520

atg tct gac ctg gca cta ggt gtg aac agc tac tat gta ctc cag atc
1697
Met Ser Asp Leu Ala Leu Gly Val Asn Ser Tyr Tyr Val Leu Gln Ile

    525   530   535

att gaa cag gat gat ggg tct gag tgc tac gta ttt cgt aag tgg gga
1745
Ile Glu Gln Asp Asp Gly Ser Glu Cys Tyr Val Phe Arg Lys Trp Gly

540   545   550   555

cgg gtt ggg agt gag aaa att gga ggg caa aaa ctg gag gag atg tca
1793
Arg Val Gly Ser Glu Lys Ile Gly Gly Gln Lys Leu Glu Glu Met Ser

        560   565   570

aaa act gag gca atc aag gaa ttc aaa aga tta ttt ctt gag aag act
1841
Lys Thr Glu Ala Ile Lys Glu Phe Lys Arg Leu Phe Leu Glu Lys Thr

       575   580   585

gga aac tca tgg gaa gct tgg gaa tgt aaa acc aat ttt cgg aag cag
1889
Gly Asn Ser Trp Glu Ala Trp Glu Cys Lys Thr Asn Phe Arg Lys Gln

       590   595   600

cct ggg aga ttt tac cca ctt gat gtt gat tat ggt gtt aag aaa gca
1937
Pro Gly Arg Phe Tyr Pro Leu Asp Val Asp Tyr Gly Val Lys Lys Ala

      605   610   615

cca aaa cgg aaa gat atc agt gaa atg aaa agt tct ctt gct cct caa
1985
Pro Lys Arg Lys Asp Ile Ser Glu Met Lys Ser Ser Leu Ala Pro Gln

620   625   630   635

ttg cta gaa ctc atg aag atg ctt ttc aat gtg gag aca tat aga gct
2033
Leu Leu Glu Leu Met Lys Met Leu Phe Asn Val Glu Thr Tyr Arg Ala

       640   645   650

gct atg atg gaa ttt gaa att aat atg tca gaa atg cct ctt ggg aag
2081
Ala Met Met Glu Phe Glu Ile Asn Met Ser Glu Met Pro Leu Gly Lys

       655   660   665

cta agc aag gaa aat att gag aaa gga ttt gaa gca tta act gag ata
2129
Leu Ser Lys Glu Asn Ile Glu Lys Gly Phe Glu Ala Leu Thr Glu Ile

670   675   680

cag aat tta ttg aag gac acc gct gat caa gca ctg gct gtt aga gaa
2177
Gln Asn Leu Leu Lys Asp Thr Ala Asp Gln Ala Leu Ala Val Arg Glu

     685   690   695

agc tta att gtt gct gcg agc aat cgc ttt ttc act ctt atc cct tct
2225
Ser Leu Ile Val Ala Ala Ser Asn Arg Phe Phe Thr Leu Ile Pro Ser

700   705   710   715

att cat cct cat att ata cgg gat gag gat gat ttg atg atc aaa gcg
2273
Ile His Pro His Ile Ile Arg Asp Glu Asp Asp Leu Met Ile Lys Ala

               720   725   730

aaa atg ctt gaa gct ctg cag gat att gaa att gct tca aag ata gtt
2321
Lys Met Leu Glu Ala Leu Gln Asp Ile Glu Ile Ala Ser Lys Ile Val

          735   740   745

ggc ttc gat agc gac agt gat gaa tct ctt gat gat aaa tat atg aaa
2369
Gly Phe Asp Ser Asp Ser Asp Glu Ser Leu Asp Asp Lys Tyr Met Lys

          750   755   760

ctt cac tgt gac atc acc ccg ctg gct cac gat agt gaa gat tac aag
2417
Leu His Cys Asp Ile Thr Pro Leu Ala His Asp Ser Glu Asp Tyr Lys

          765   770   775

tta att gag cag tat ctc ctc aac aca cat gct cct act cac aag gac
2465
Leu Ile Glu Gln Tyr Leu Leu Asn Thr His Ala Pro Thr His Lys Asp

780   785   790   795

tgg tcg ctg gaa ctg gag gaa gtt ttt tca ctt gat cga gat gga gaa
2513
Trp Ser Leu Glu Leu Glu Glu Val Phe Ser Leu Asp Arg Asp Gly Glu

               800   805   810

ctt aat aag tac tca aga tat aaa aat aat ctg cat aac aag atg cta
2561
Leu Asn Lys Tyr Ser Arg Tyr Lys Asn Asn Leu His Asn Lys Met Leu

          815   820   825

tta tgg cac ggt tca agg ttg acg aat ttt gtg gga att ctt agt caa
2609
Leu Trp His Gly Ser Arg Leu Thr Asn Phe Val Gly Ile Leu Ser Gln

          830   835   840

ggg cta aga att gca cct cct gag gca cct gtt act ggc tat atg ttc
2657
Gly Leu Arg Ile Ala Pro Pro Glu Ala Pro Val Thr Gly Tyr Met Phe

          845   850   855

ggc aaa ggc ctc tac ttt gca gat cta gta agc aag agc gca caa tac
2705
Gly Lys Gly Leu Tyr Phe Ala Asp Leu Val Ser Lys Ser Ala Gln Tyr

860   865   870   875

tgt tat gtg gat agg aat aat cct gta ggt ttg atg ctt ctt tct gag
2753
Cys Tyr Val Asp Arg Asn Asn Pro Val Gly Leu Met Leu Leu Ser Glu

               880   885   890

gtt gct tta gga gac atg tat gaa cta aag aaa gcc acg tcc atg gac
2801

Val Ala Leu Gly Asp Met Tyr Glu Leu Lys Lys Ala Thr Ser Met Asp

　　　　　895　　　　　　　　　900　　　　　　　　　905

aaa cct cca aga ggg aag cat tcg acc aag gga tta ggc aaa acc gtg
2849
Lys Pro Pro Arg Gly Lys His Ser Thr Lys Gly Leu Gly Lys Thr Val

　　　　　910　　　　　　　　　915　　　　　　　　　920

cca ctg gag tca gag ttt gtg aag tgg agg gat gat gtc gta gtt ccc
2897
Pro Leu Glu Ser Glu Phe Val Lys Trp Arg Asp Asp Val Val Val Pro

　　　925　　　　　　　　　930　　　　　　　　　935

tgc ggc aag ccg gtg cca tca tca att agg agc tct gaa ctc atg tac
2945
Cys Gly Lys Pro Val Pro Ser Ser Ile Arg Ser Ser Glu Leu Met Tyr

　940　　　　　　　　　945　　　　　　　　　950　　　　　　　　　955

aat gag tac atc gtc tac aac aca tcc cag gtg aag atg cag ttc ttg
2993
Asn Glu Tyr Ile Val Tyr Asn Thr Ser Gln Val Lys Met Gln Phe Leu

　　　　　960　　　　　　　　　965　　　　　　　　　970

ctg aag gtg cgt ttc cat cac aag agg tagctgggag actaggcaag
3040
Leu Lys Val Arg Phe His His Lys Arg

　　　　975　　　　　　　　　980

tagagttgga aggtagagaa gcagagttag gcgatgcctc ttttggtatt attagtaagc
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ctggcatgta tttatgggtg ctcgcgcttg atccattttg gtaagtgttg cttgggcatc
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        35   40   45

Met Trp Asn His Ala Arg Cys Ile Phe Ser Lys Lys Asn Gln Ile Lys
    50   55   60

Ser Val Asp Asp Val Glu Gly Ile Asp Ala Leu Arg Trp Asp Asp Gln
65   70   75   80

Glu Lys Ile Arg Asn Tyr Val Gly Ser Ala Ser Ala Gly Thr Ser Ser
                85   90   95

Thr Ala Ala Pro Pro Glu Lys Cys Thr Ile Glu Ile Ala Pro Ser Ala
            100   105   110

Arg Thr Ser Cys Arg Arg Cys Ser Glu Lys Ile Thr Lys Gly Ser Val
        115   120   125

Arg Leu Ser Ala Lys Leu Glu Ser Glu Gly Pro Lys Gly Ile Pro Trp
    130   135   140

Tyr His Ala Asn Cys Phe Phe Glu Val Ser Pro Ser Ala Thr Val Glu
145   150   155   160

Lys Phe Ser Gly Trp Asp Thr Leu Ser Asp Glu Asp Lys Arg Thr Met
                165   170   175

Leu Asp Leu Val Lys Lys Asp Val Gly Asn Asn Glu Gln Asn Lys Gly
            180   185   190

Ser Lys Arg Lys Lys Ser Glu Asn Asp Ile Asp Ser Tyr Lys Ser Ala
        195   200   205

Arg Leu Asp Glu Ser Thr Ser Glu Gly Thr Val Arg Asn Lys Gly Gln
    210   215   220

Leu Val Asp Pro Arg Gly Ser Asn Thr Ser Ser Ala Asp Ile Gln Leu
225   230   235   240

Lys Leu Lys Glu Gln Ser Asp Thr Leu Trp Lys Leu Lys Asp Gly Leu
                245   250   255

Lys Thr His Val Ser Ala Ala Glu Leu Arg Asp Met Leu Glu Ala Asn
            260   265   270

Gly Gln Asp Thr Ser Gly Pro Glu Arg His Leu Leu Asp Arg Cys Ala
        275   280   285

Asp Gly Met Ile Phe Gly Ala Leu Gly Pro Cys Pro Val Cys Ala Asn
    290   295   300

Gly Met Tyr Tyr Tyr Asn Gly Gln Tyr Gln Cys Ser Gly Asn Val Ser
305   310   315   320

Glu Trp Ser Lys Cys Thr Tyr Ser Ala Thr Glu Pro Val Arg Val Lys
                325   330   335

Lys Lys Trp Gln Ile Pro His Gly Thr Lys Asn Asp Tyr Leu Met Lys
            340   345   350

Trp Phe Lys Ser Gln Lys Val Lys Lys Pro Glu Arg Val Leu Pro Pro
            355   360   365

Met Ser Pro Glu Lys Ser Gly Ser Lys Ala Thr Gln Arg Thr Ser Leu
    370   375   380

Leu Ser Ser Lys Gly Leu Asp Lys Leu Arg Phe Ser Val Val Gly Gln
385   390   395   400

Ser Lys Glu Ala Ala Asn Glu Trp Ile Glu Lys Leu Lys Leu Ala Gly
            405   410   415

Ala Asn Phe Tyr Ala Arg Val Val Lys Asp Ile Asp Cys Leu Ile Ala
            420   425   430

Cys Gly Glu Leu Asp Asn Glu Asn Ala Glu Val Arg Lys Ala Arg Arg
            435   440   445

Leu Lys Ile Pro Ile Val Arg Glu Gly Tyr Ile Gly Glu Cys Val Lys
    450   455   460

Lys Asn Lys Met Leu Pro Phe Asp Leu Tyr Lys Leu Glu Asn Ala Leu
465   470   475   480

Glu Ser Ser Lys Gly Ser Thr Val Thr Val Lys Val Lys Gly Arg Ser
            485   490   495

Ala Val His Glu Ser Ser Gly Leu Gln Asp Thr Ala His Ile Leu Glu
            500   505   510

Asp Gly Lys Ser Ile Tyr Asn Ala Thr Leu Asn Met Ser Asp Leu Ala
            515   520   525

Leu Gly Val Asn Ser Tyr Tyr Val Leu Gln Ile Ile Glu Gln Asp Asp
    530   535   540

Gly Ser Glu Cys Tyr Val Phe Arg Lys Trp Gly Arg Val Gly Ser Glu
545   550   555   560

Lys Ile Gly Gly Gln Lys Leu Glu Glu Met Ser Lys Thr Glu Ala Ile
                565   570   575

Lys Glu Phe Lys Arg Leu Phe Leu Glu Lys Thr Gly Asn Ser Trp Glu
            580   585   590

Ala Trp Glu Cys Lys Thr Asn Phe Arg Lys Gln Pro Gly Arg Phe Tyr
        595   600   605

Pro Leu Asp Val Asp Tyr Gly Val Lys Lys Ala Pro Lys Arg Lys Asp
    610   615   620

Ile Ser Glu Met Lys Ser Ser Leu Ala Pro Gln Leu Leu Glu Leu Met
625   630   635   640

Lys Met Leu Phe Asn Val Glu Thr Tyr Arg Ala Ala Met Met Glu Phe
            645   650   655

Glu Ile Asn Met Ser Glu Met Pro Leu Gly Lys Leu Ser Lys Glu Asn
            660   665   670

Ile Glu Lys Gly Phe Glu Ala Leu Thr Glu Ile Gln Asn Leu Leu Lys
        675   680   685

Asp Thr Ala Asp Gln Ala Leu Ala Val Arg Glu Ser Leu Ile Val Ala
    690   695   700

Ala Ser Asn Arg Phe Phe Thr Leu Ile Pro Ser Ile His Pro His Ile
705   710   715   720

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Ile Arg Asp Glu Asp Asp Leu Met Ile Lys Ala Lys Met Leu Glu Ala
                725   730   735

Leu Gln Asp Ile Glu Ile Ala Ser Lys Ile Val Gly Phe Asp Ser Asp
                740   745   750

Ser Asp Glu Ser Leu Asp Asp Lys Tyr Met Lys Leu His Cys Asp Ile
        755   760   765

Thr Pro Leu Ala His Asp Ser Glu Asp Tyr Lys Leu Ile Glu Gln Tyr
    770   775   780

Leu Leu Asn Thr His Ala Pro Thr His Lys Asp Trp Ser Leu Glu Leu
785   790   795   800

Glu Glu Val Phe Ser Leu Asp Arg Asp Gly Glu Leu Asn Lys Tyr Ser
            805   810   815

Arg Tyr Lys Asn Asn Leu His Asn Lys Met Leu Leu Trp His Gly Ser
            820   825   830

Arg Leu Thr Asn Phe Val Gly Ile Leu Ser Gln Gly Leu Arg Ile Ala
        835   840   845

Pro Pro Glu Ala Pro Val Thr Gly Tyr Met Phe Gly Lys Gly Leu Tyr
    850   855   860

Phe Ala Asp Leu Val Ser Lys Ser Ala Gln Tyr Cys Tyr Val Asp Arg
865   870   875   880

Asn Asn Pro Val Gly Leu Met Leu Leu Ser Glu Val Ala Leu Gly Asp
            885   890   895

Met Tyr Glu Leu Lys Lys Ala Thr Ser Met Asp Lys Pro Pro Arg Gly
            900   905   910

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Lys His Ser Thr Lys Gly Leu Gly Lys Thr Val Pro Leu Glu Ser Glu
        915             920             925


Phe Val Lys Trp Arg Asp Asp Val Val Val Pro Cys Gly Lys Pro Val
    930             935             940


Pro Ser Ser Ile Arg Ser Ser Glu Leu Met Tyr Asn Glu Tyr Ile Val
945             950             955             960


Tyr Asn Thr Ser Gln Val Lys Met Gln Phe Leu Leu Lys Val Arg Phe
            965             970             975


His His Lys Arg
        980
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            20              25              30


Glu Glu Ala Ile Ala Glu Asp Thr Lys Lys Glu Glu Ser Lys Ser Lys
        35              40              45
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Arg Lys Arg Asn Ser Ser Asn Asp Thr Tyr Glu Ser Asn Lys Leu Ile
   50   55   60

Ala Ile Gly Glu Phe Arg Gly Met Ile Val Lys Glu Leu Arg Glu Glu
65   70   75   80

Ala Ile Lys Arg Gly Leu Asp Thr Thr Gly Thr Lys Lys Asp Leu Leu
          85   90   95

Glu Arg Leu Cys Asn Asp Ala Asn Asn Val Ser Asn Ala Pro Val Lys
         100   105   110

Ser Ser Asn Gly Thr Asp Glu Ala Glu Asp Asp Asn Asn Gly Phe Glu
     115   120   125

Glu Glu Lys Lys Glu Glu Lys Ile Val Thr Ala Thr Lys Lys Gly Ala
   130   135   140

Ala Val Leu Asp Gln Trp Ile Pro Asp Glu Ile Lys Ser Gln Tyr His
145   150   155   160

Val Leu Gln Arg Gly Asp Asp Val Tyr Asp Ala Ile Leu Asn Gln Thr
         165   170   175

Asn Val Arg Asp Asn Asn Asn Lys Phe Phe Val Leu Gln Val Leu Glu
       180   185   190

Ser Asp Ser Lys Lys Thr Tyr Met Val Tyr Thr Arg Trp Gly Arg Val
     195   200   205

Gly Val Lys Gly Gln Ser Lys Leu Asp Gly Pro Tyr Asp Ser Trp Asp
   210   215   220

Arg Ala Ile Glu Ile Phe Thr Asn Lys Phe Asn Asp Lys Thr Lys Asn
225   230   235   240

Tyr Trp Ser Asp Arg Lys Glu Phe Ile Pro His Pro Lys Ser Tyr Thr
                245   250   255

Trp Leu Glu Met Asp Tyr Gly Lys Glu Glu Asn Asp Ser Pro Val Asn
                260   265   270

Asn Asp Ile Pro Ser Ser Ser Ser Glu Val Lys Pro Glu Gln Ser Lys
                275   280   285

Leu Asp Thr Arg Val Ala Lys Phe Ile Ser Leu Ile Cys Asn Val Ser
        290   295   300

Met Met Ala Gln His Met Met Glu Ile Gly Tyr Asn Ala Asn Lys Leu
305   310   315   320

Pro Leu Gly Lys Ile Ser Lys Ser Thr Ile Ser Lys Gly Tyr Glu Val
                325   330   335

Leu Lys Arg Ile Ser Glu Val Ile Asp Arg Tyr Asp Arg Thr Arg Leu
                340   345   350

Glu Glu Leu Ser Gly Glu Phe Tyr Thr Val Ile Pro His Asp Phe Gly
        355   360   365

Phe Lys Lys Met Ser Gln Phe Val Ile Asp Thr Pro Gln Lys Leu Lys
        370   375   380

Gln Lys Ile Glu Met Val Glu Ala Leu Gly Glu Ile Glu Leu Ala Thr
385   390   395   400

Lys Leu Leu Ser Val Asp Pro Met Val Arg Pro Val Glu Thr Pro Thr
                405   410   415

Arg Glu Ile Lys Lys Leu Asp Gly Leu Trp Ala Phe Ser Leu Asp Arg
                420   425   430

Glu Asn Cys Gly Ile Asp Gln Arg Trp Trp Glu Ser Ala Leu Gln Glu
     435   440   445

Ser Arg Ala Ile Ala Val Pro Gly Ser Phe Asn Asp Gln Phe Ala Asp
     450   455   460

Ala Asp Ile Arg Asn Tyr Ala Gly Asn Val Trp Tyr Gln Arg Glu Val
465   470   475   480

Phe Ile Pro Lys Gly Trp Ala Gly Gln Arg Ile Val Leu Arg Phe Asp
          485   490   495

Ala Val Thr His Tyr Gly Lys Val Trp Val Asn Asn Gln Glu Val Met
        500   505   510

Glu His Gln Gly Gly Tyr Thr Pro Phe Glu Ala Asp Val Thr Pro Tyr
        515   520   525

Val Ile Ala Gly Lys Ser Val Arg Ile Thr Val Cys Val Asn Asn Glu
     530   535   540

Leu Asn Trp Gln Thr Ile Pro Pro Gly Met Val Ile Thr Asp Glu Asn
545   550   555   560

Gly Lys Lys Lys Gln Ser Tyr Phe His Asp Phe Phe Asn Tyr Ala Gly
        565   570   575

Ile His Arg Ser Val Met Leu Tyr Thr Thr Pro Asn Thr Trp Val Asp
        580   585   590

Asp Ile Thr Val Val Thr His Val Ala Gln Asp Cys Asn His Ala Ser
        595   600   605

Val Asp Trp Gln Val Val Ala Asn Gly Asp Val Ser Val Glu Leu Arg
     610   615   620

Asp Ala Asp Gln Gln Val Val Ala Thr Gly Gln Gly Thr Ser Gly Thr
625   630   635   640

Leu Gln Val Val Asn Pro His Leu Trp Gln Pro Gly Glu Gly Tyr Leu
                645   650   655

Tyr Glu Leu Cys Val Thr Ala Lys Ser Gln Thr Glu Cys Asp Ile Tyr
            660   665   670

Pro Leu Arg Val Gly Ile Arg Ser Val Ala Val Lys Gly Glu Gln Phe
            675   680   685

Leu Ile Asn His Lys Pro Phe Tyr Phe Thr Gly Phe Gly Arg His Glu
    690   695   700

Asp Ala Asp Leu Arg Gly Lys Gly Phe Asp Asn Val Leu Met Val His
705   710   715   720

Asp His Ala Leu Met Asp Trp Ile Gly Ala Asn Ser Tyr Arg Thr Ser
                725   730   735

His Tyr Pro Tyr Ala Glu Glu Met Leu Asp Trp Ala Asp Glu His Gly
            740   745   750

Ile Val Val Ile Asp Glu Thr Ala Ala Val Gly Phe Asn Leu Ser Leu
        755   760   765

Gly Ile Gly Phe Glu Ala Gly Asn Lys Pro Lys Glu Leu Tyr Ser Glu
    770   775   780

Glu Ala Val Asn Gly Glu Thr Gln Gln Ala His Leu Gln Ala Ile Lys
785   790   795   800

Glu Leu Ile Ala Arg Asp Lys Asn His Pro Ser Val Val Met Trp Ser
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Ile Ala Asn Glu Pro Asp Thr Arg Pro Gln Gly Ala Arg Glu Tyr Phe
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Ala Pro Leu Ala Glu Ala Thr Arg Lys Leu Asp Pro Thr Arg Pro Ile
              835   840   845

Thr Cys Val Asn Val Met Phe Cys Asp Ala His Thr Asp Thr Ile Ser
    850   855   860

Asp Leu Phe Asp Val Leu Cys Leu Asn Arg Tyr Tyr Gly Trp Tyr Val
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Gln Ser Gly Asp Leu Glu Thr Ala Glu Lys Val Leu Glu Lys Glu Leu
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Leu Ala Trp Gln Glu Lys Leu His Gln Pro Ile Ile Ile Thr Glu Tyr
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Gly Val Asp Thr Leu Ala Gly Leu His Ser Met Tyr Thr Asp Met Trp
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Ser Glu Glu Tyr Gln Cys Ala Trp Leu Asp Met Tyr His Arg Val Phe
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Asp Arg Val Ser Ala Val Val Gly Glu Gln Val Trp Asn Phe Ala Asp
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Phe Ala Thr Ser Gln Gly Ile Leu Arg Val Gly Gly Asn Lys Lys Gly
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Ile Phe Thr Arg Asp Arg Lys Pro Lys Ser Ala Ala Phe Leu Leu Gln
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Lys Arg Trp Thr Gly Met Asn Phe Gly Glu Lys Pro Gln Gln Gly Gly
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